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10/539,622	06/17/2005	Bruno Le Breton	4590-425	4601

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EXAMINER	
PATEL, DHAVAL V	
ART UNIT	PAPER NUMBER
2611	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,622	LE BRETON ET AL.	
	Examiner	Art Unit	
	DHAVAL PATEL	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4-15,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4-15,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The objection to specification has been withdrawn.

2. The rejection of claims 2-4, 13, 14 and 16 with respect to 35 USC 112, 2nd has been withdrawn.

3. Examiner has acknowledged cancelled claims 1, 3 and 16.

4. Applicant's arguments with respect to claims 7, 13 and 14 have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's arguments filed on 9/4/2008 with respect to claim 2 have been fully considered but they are not persuasive.

Regarding applicant's specific argument that "Neither Lammanen nor wright disclose or suggest defining the channels based on minimum distance between the channels".

In response to applicant's argument, page 4, lines 9-15 discloses that the sub channels of multi carrier system may be allocated at equal or unequal bandwidths in the frequency spectrum, and they can spaced at equal or unequal distance from each other over the frequency bandwidth. Also, Lammnen discloses the filter structure to generate the uniform or non-uniform multi carrier communication (page 4, lines 5-11, furthermore, to clarify, it is well-known to one of ordinary skilled in the art that the sub carriers in multicarrier system are spaced apart from each other to avoid the interference. subcarriers can be a orthogonal to each other by generating the distance across the sub

carriers. Thus, to avoid such interference or to keep orthogonality during transmission, system must calculate the distance between the sub carriers.

For above mentioned reasons, examiner has maintained the same grounds of rejection for amended claim 2.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Kumar et al. (US 7,046,694) (hereafter Kumar).**

Regarding claim 13, Kumar discloses a receiver of digital signals conveyed on a given useful frequency band by a transmitter comprising a demodulator (Fig. 9, 213 and 215) wherein: a decoder (Fig. 9, bit estimator, 231, as shown in Fig. 12m bit estimator has decoder) associated with the error corrector coder (Fig. 4, ECC encoder) of the transmitter (Fig. 4) receiving the digital signal recombined s[m] (Fig. 4, Fig. 5, sub carrier group modulator and combine, 83 and 93) by the demodulator (Fig. 9, 213, Fig. 10, sub-carrier group demodulator, 295 and parallel to serial converter, 298).

Wherein the given useful frequency band is the FM band (col. 40 lines 44-60-generating FM band signal).

Regarding claim 14, Kumar discloses a receiver (Fig. 11) of digital signals conveyed on a given useful frequency band by a transmitter (Fig. 2) comprising

- a demodulator (Fig. 9, 213)

-a deinterleaver (Fig. 9, de-interleaver, 221) associated with the interleaver (Fig. 4, interleaver, 43) of the transmitter (Fig. 4) receiving the digital signal recombined g[m] (Fig. 5, subcarrier group modulator and combined and FIg. 10, demodulator, 295, parallel to serial converter, 298) by the demodulator (Fig. 9,213),

-a decoder (Fig. 9,bit estimator, 231, Fig. 12, ECC decoder, 335) associated with the error corrector coder (Fig. 4, ECC encoder, 41) of the transmitter (Fig. 4) receiving the digital signal recombined (Fig. 9 and Fig. 10, recombined demodulated signal and parallel to serial converter, 298) deinterleaved c[m] by the deinterleaver (Fig. 9, deinterleaver, 221).

Wherein the given useful frequency band is the FM band (col. 40 lines 44-60, generating FM band signal).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: ***(See MPEP Ch. 2141)***

a. Determining the scope and contents of the prior art;
b. Ascertaining the differences between the prior art and the claims in issue;
c. Resolving the level of ordinary skill in the pertinent art; and
d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

9. **Claims 2, 4-6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laamanen et al. (WO/98/58471) (see IDS) in view of Wright et al. (US 6,704,297) (hereafter Wright).**

Regarding claims 2 and 8, Laamanen discloses a method and apparatus of modulating a digital signal of width L in frequency on a given useful frequency band comprising:

a separation of separating the digital signal into N blocks b. (1< n <N) (page 3, lines 1-5),

splitting the given useful frequency band into N contiguous parts pn (page 4, lines 2, lines 23-25, sub channels in multi-carrier system),

each block of digital signals bn over the associated channel Cn (page 3, lines 1-5 and lines 14-15).

distributing each block of digital signal bn over the associated channel (page 5, lines 8-13 and multi-carrier system).

wherein the channels Cn are defined by taking account of a predetermined minimum distance between the channels (page 4, lines 9-11 and also see response to argument).

Furthermore, Laamnen discloses that the sub channels of a multi-carrier system may be allocated equal or unequal bandwidths (claimed as different bandwidth) and they can be spaced apart (claimed as frequency bands are separated) over the frequency spectrum.

However, Lammanen does not explicitly disclose defining channels Cn, of width In in frequency, lying within an associated part Pn, the channels Cn being separated and predetermined minimum distance between the channels is determined as a function of number of N of channels, of their width and of a mean width of frequency band affected by phenomenon of flat fading.

In the same field of endeavor, Wright teaches frequency division multiple access (FDMA) technique. Within each sub band, the sub band may be further divided into multiple channels using FDMA. On the downlinks, each ground cell typically operates on at least one carrier or channel (col. 1 line 26-35 and col. 4 lines 15-33). Lammenen discloses that sub bands are spaced equally or unequally and also sub bands may be of equal width or unequal width. One of ordinary skilled in the art would recognize that whole frequency band is divided into multiple sub bands and to avoid interference between sub bands, they may be separated by distance. Furthermore, in multi-carrier system, some of the sub bands are narrow so as to transfer more data in narrow

bandwidth to avoid interference or fading. Such factors would be obvious to calculate distance between channels so as to mitigate the effects of interference or fading.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention, to incorporate such frequency multiplexing technique, as taught by Wright, into the system of Lammanen, to send or distribute blocks of data to a particular channel within sub-bands (it is already established that sub-bands are separated and can be of unequal width), the motivation is efficient bandwidth allocation.

Regarding claim 4, the combined teachings of Lammenen and Wright do not explicitly discloses the method of modulation comprising:

determining the minimum distance between the channels, the minimum distance being determined as a function of the number N of channels, of their width In, and of the mean width of the frequency band affected by the phenomenon of flat fading. The method of modulation wherein the minimum distance is determined such that minorities of channels Cn are affected by the phenomenon of fiat fading.

However, Lammenen discloses that sub bands are spaced equally or unequally and also sub bands may be of equal width or unequal width. One of ordinary skilled in the art would recognize that whole frequency band is divided into multiple sub bands and to avoid interference between sub bands, they may be separated by distance. Furthermore, in multi-carrier system, some of the sub bands are narrow so as to transfer more data in narrow bandwidth to avoid interference or fading. Such factors

would be obvious to calculate distance between channels so as to mitigate the effects of interference or fading.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to determine distance between channels based on the widths of the channels and total number of channels to effects by fading, the motivation is to allocate bandwidths efficiently.

Regarding claims 5, Lammanen further discloses the method of modulation as claimed in the claim 1, wherein the channels Cn are of identical widths equal to an Nth of the width of the digital signal L: In = L/N, 1<n<N (page 4, lines 9-13).

Regarding claim 6, Lammanen and Wright do not explicitly discloses The method of digital modulation as claimed in the claim 1 wherein: the digital signal is separated into N = 2 blocks b, the given useful frequency band is split into N = 2 parts pn, the first block bl is distributed over a channel Cl of width L/2 lying within the first part Pl of the given useful frequency band and the second block bl is distributed over a channel C2 of width L/2 lying within the second part P2 of the given useful frequency band.

However, Lammnen discloses that the sub channels of a multi carrier system may be allocated equal bandwidths in the frequency spectrum and they can be space at equal or unequal distance from each other over the frequency spectrum. One of

ordinary skilled in the art would easily recognized that the frequency band could be split into two bands instead of N bands so that two blocks of data could be modulated to the two sub bands. Furthermore, both bands are separated. Wright discloses that user data can be transferred within one sub and using one particular channel.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Wright, into the system of Lammenen, so as to use the particular channel within first sub band to transfer first block of data and second channel within second subband, separated by equal distance, to transfer the second block of data, the motivation is adaptive bandwidth allocation and less complexity.

Regarding claim 9, Lammenen discloses a demodulator of digital signals conveyed on a given useful frequency band by a transmitter comprising a modulator (Fig. 3, modulator multiplexing incoming data into the sub carrier) comprising:

means of scanning N blocks bn of signals distributed over these channels (Fig. 3, channel), means of recombination of the channels into a digital signal g[m] (Fig. 3, recombined multiple parallel channel data d1..dn).

However, Lammenen does not explicitly disclose combining N channels Cn reading of the N blocks of signals distributed over the channels and combining N channels Cn.

In the same field of endeavor, Wright teaches FDMA technique in which frequency band is divided into sub-bands, which are further divided into the channels for data communication.

Therefore, for the same motivations established for claims 1 and 8, it would have been obvious to one of ordinary skilled in the art at the time of the invention to use such FDMA technique to multiplexed input data to particular channel within sub band and combine the blocks of data to recover the data.

10. **Claim 7, 10-12, 15, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laamanen and Wright, as applied to claim 2 above, and further in view of Kumar et al. (US 7,046,6940)(hereafter Kumar).**

Regarding claim 7, Lammanen and Wright do not explicitly discloses the method of modulation as claimed in the wherein the given useful frequency band is the FM band

In the same field of endeavor, Kumar teaches the transmission and reception of in band on channel digital broadcasting method in which it discloses the sub-carrier signal generation and combined them to generate onto the FM band (Fig. 7, col. 40 lines 44-60, generating the FM band signal).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to generate the combined sub carrier signals onto FM band, as taught by Kumar, into the system of both Lammanen and Wright, as a whole, so as to perform the multicarrier system in which the carriers are generated on FM band, the

motivation is to combating the deleterious effects of flat-fade multi-path (col. 32 lines 23-28).

Regarding claim 10, the combined teachings of both Lammenen and Wright do not explicitly discloses a transmitter of digital signals on a given useful frequency band comprising at least one transmission chain comprising a modulator wherein the transmission chain comprises an error corrector coder conveying the coded digital signal cq[m] to the modulator.

In the same field of endeavor, Kumar teaches transmission of digital signals comprising a modulator (Fig. 5, sub carrier group modulator, 47 and 57 and combiner 59) and error corrector (Fig. 4, ECC encoder, 41) and error corrector (Fig. 4, 41) is conveying the coded signal to the modulator for transmission (Fig. 4, sub carrier modulation, 47 and 57).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to use such modulator and error correction coder, as taught by Kumar, into the system of both Lammanen and Wright, as a whole, to modulate the sub carriers and combined the error corrected signal, the motivation is to combating the deleterious effects of flat-fade multi-path (col. 32 lines 23-28).

Regarding claim 11, the combined teachings of both Lammenen and Wright do not explicitly disclose the transmitter wherein the transmission chain comprises an interleaver placed between the error corrector coder and the modulator.

In the same field of endeavor, Kumar teaches interleaver (Fig. 1, interleaver, 43) in transmitter, placed between error corrector coder (Fig. 1, ECC, 41) and modulator (Fig. 4, modulator, 47 and 57).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to use such interleaver, as taught by Kumar, into the system of both Lammenen and Wright, as a whole, to interleaving the encoded signal to mitigate interference, the overall motivation is to combating the deleterious effects of flat-fade multi-path (col. 32 lines 23-28).

Regarding claim 12, the combined teachings of Lammenen and Wright does not explicitly disclose the transmitter as claimed in the claim 10, wherein a distinct set of channels {Cqn} is associated with each of the Q transmission chains.

In the same field of endeavor, Kumar teaches wherein a distinct set of channels {Cqn} is associated with each of the Q transmission chains (Fig. 4 and 5, sub carrier modulator).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to use such combine the subcarrier modulated signal, as taught by Kumar, into the system of both Lammenen and Wright, as a whole, the overall motivation is to combating the deleterious effects of flat-fade multi-path (col. 32 lines 23-28).

Regarding claim 15, Kumar further discloses use of the transmitter for conveying digital signals in the FM band (col. 40 lines 44-60, generating FM band signal).

Regarding claims 17 and 18, Lammanen and Wright are silent about a receiver of digital signals conveyed on a given useful frequency band by a transmitter as claimed in claim 10 comprising a demodulator wherein: a decoder associated with the error corrector coder of the transmitter receiving the digital signal recombined g[m] by the demodulator.

In the same field of endeavor, Kumar teaches transmitter comprising a demodulator (Fig. 9, 213 and 215) wherein: a decoder (Fig. 9, bit estimator, 231, as shown in Fig. 12m bit estimator has decoder) associated with the error corrector coder (Fig. 4, ECC encoder) of the transmitter (Fig. 4) receiving the digital signal recombined s[m] (Fig. 4, Fig. 5, subcarrier group modulator and combine, 83 and 93) by the demodulator (Fig. 9, 213, Fig. 10, sub-carrier group demodulator, 295 and parallel to serial converter, 298).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to use such combine the teachings of Kumar, into the system of both Lammenen and Wright, as a whole, to generate the demodulated and decoded FM band signal, the overall motivation is to combating the deleterious effects of flat-fade multi-path (col. 32 lines 23-28).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patel Dhaval whose telephone number is (571) 270-1818. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

//Dhaval Patel/

Examiner, Art Unit 2611

12/10/2008

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611